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(54) **COLOUR MIXING CUP ADAPTING ASSEMBLY FOR CONNECTING THE CUP TO A GRAVITY  
FEED PAINT SPRAYER**

**ADAPTER FÜR FARBMISCHBEHÄLTER ZUR VERBINDUNG DESSELBEN MIT EINER  
SCHWERKRAFTGESPEISTEN FARBSPRITZPISTOLE**

**ENSEMBLE D'ADAPTATION A UN TAMBOUR MELANGEUR DE COULEURS DESTINE A  
CONNECTER LE TAMBOUR A UN VAPORISATEUR DE PEINTURE PAR GRAVITE**

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## Description

### Field of the Invention

**[0001]** The present invention relates to the liquid supply assemblies for gravity fed liquid (e.g., paint) spraying devices or spray guns.

### Background of the Invention

**[0002]** Various liquid supply assemblies have been described for use with gravity fed liquid (e.g., paint) spraying devices or spray guns, including those described in the international application published as International Publication Number WO 98/32539 on July 30, 1998. In WO 98/32539 a liquid supply assembly is described, wherein liquid to be supplied to the liquid spraying device is contained in a disposable collapsible liner within a container. While that the container can have indicia on its side wall, it does not contain the liquid, but only closely supports the liner in which the liquid is contained and has an air hole through its base through which air can enter to allow the liner to collapse as liquid is withdrawn from it. The supply assembly including a collapsible liner that is described and claimed in that application should provide advantages over the prior art liquid supply assembly also described in that application.

### Disclosure of the Invention

**[0003]** The present invention provides a liquid supply assembly for use with gravity fed liquid spraying devices that, like the liquid supply assembly described and claimed in WO 98/32539, should also provide advantages over the prior art liquid supply assembly described in that application.

**[0004]** According to the present invention there is provided a liquid supply assembly adapted for use on a gravity fed liquid spraying device as recited in claim 1.

**[0005]** The mixing cup is of a known type commonly used in paint shops to mix different paints and/or to mix paint with solvent. Those liquids are mixed using indicia on the side walls of the mixing cup. That indicia indicates the levels to which two or three different liquids should be sequentially poured into the mixing cup to provide a predetermined ratio between those liquids, such indicia being provided for a plurality of different ratios. Prior to this invention, liquid from the mixing cup was poured into a liquid supply assembly for a spray gun, and if liquid remained after the spraying operation was complete, that remaining liquid was sometimes poured back into the mixing cup, an air tight cover was applied thereto, and the liquid (e.g., paint) was stored for future use in the covered mixing cup.

**[0006]** The present invention affords further use of that mixing cup as part of the liquid supply assembly for the spraying device. This eliminates the need to pour

the mixed liquid (e.g., paint) out of the mixing cup prior to spraying, or to pour unsprayed liquid back into the mixing cup after the spraying operation. Instead, the liquid is mixed in the mixing cup, remains in the mixing cup during the spraying operation when the mixing cup becomes part of the liquid supply assembly for the spraying device, and if unsprayed liquid remains after the spraying operation, it can be retained in the mixing cup which is then separated from the rest of the liquid supply assembly and can have a conventional air tight cover applied to it for storage.

**[0007]** A vacuum relief for the liquid supply assembly is provided by inserting a tapered removable pin (e.g., a pin of the type sometimes called a "push pin") through the side wall of the mixing cup adjacent its bottom wall. That pin is removed during use of the mixing cup in the liquid supply assembly for the spraying device when the mixing cup is positioned with its bottom wall uppermost so that air can enter the cup through an air passageway formed by the pin above the liquid being supplied to the spraying device. Before and after the spraying operation when the cup is supported on its bottom wall that pin may be positioned in the passageway it forms to preclude liquid leaking out of the mixing cup through that passageway.

**[0008]** The liquid supply assembly can also include a removable filter assembly for filtering liquid leaving the mixing cup during the spraying operation.

### Brief Description of Drawing

**[0009]** The present invention will be further described with reference to the accompanying drawing wherein like reference numerals refer to like parts in the several views, and wherein:

Figure 1 is an exploded perspective view of a liquid supply assembly according to the present invention;

Figure 2 is an enlarged sectional view taken approximately along section line 2-2 of Figure 1;

Figure 3 is an enlarged exploded perspective view of the liquid supply assembly of Figure 1 together with a fragment of a spraying device or spray gun to which the liquid supply assembly is adapted to be attached;

Figure 4 is an end view of a second adapter included in the liquid supply assembly of Figure 1;

Figure 5 is a perspective view of the liquid supply assembly of Figure 1 attached to an inverted spraying device or spray gun;

Figure 6 is a perspective view of the liquid supply assembly of Figure 1 attached to the spraying device as in Figure 5 and inverted to the position used for spraying liquid with the spraying device; and

Figure 7 is a perspective view of a mixing cup included in the liquid supply assembly of Figure 1, which mixing cup has been separated from the rest

of the liquid supply assembly and has had a conventional cover applied to it.

#### Detailed Description of the Invention

**[0010]** Referring now to the drawing there is illustrated a liquid supply assembly according to the present invention generally designated by the reference numeral 10. That liquid supply assembly 10 (as is illustrated in Figures 3, 5 and 6) can be used to supply liquid for a conventional gravity fed liquid spraying device or spray gun 11 (e.g., the spray gun commercially designated NR 95 that is available from Sata, Farbspritztechnik GmbH & Co., Kornwestheim, Germany).

**[0011]** As is best seen in Figures 1 and 3, the liquid supply assembly 10 includes a conventional paint mixing cup 12 of stiff polymeric material (e.g., the polyethylene mixing cups commercially available from PPG, Cleveland, Ohio, which can be obtained in 8 ounce or 240ml, or 16 ounce or 480ml, or 24 ounce or 720ml, or 32 ounce or 960 ml sizes). The paint mixing cup comprises a generally cylindrical side wall 13 having top and bottom ends 14 and 15, a bottom wall 16 extending across and closing the bottom end 15 of the side wall 13, and an outwardly projecting lip 18 around the top end 14 of the side wall 13. The top end 14 of the side wall 13 defines an opening into the cup 12. The side wall 13 bears indicia 19 indicating the levels to which two or three different liquids should be sequentially poured into the cup 12 through that opening to provide a predetermined ratio between those liquids, that indicia 19 being provided for a plurality of different ratios. The side wall 13 is sufficiently translucent to afford seeing the liquid level in the cup 12 through the side wall 13 which assists a person in adding liquids to the desired levels indicated by the indicia 19.

**[0012]** The liquid supply assembly 10 also includes a first adapter 20, (see Figures 1, 2, and 3) preferably molded of polymeric material (e.g., polyethylene), having opposite inner and outer major surfaces 21 and 22. The first adapter 20 comprises a central generally cylindrical portion 24 having a through opening 26 and a transverse portion 28 including a peripheral part 30. The transverse portion 28 defines a groove 32 along its inner surface that is adapted for sealing engagement with the top end 14 and outwardly projecting lip 18 of the paint mixing cup 12.

**[0013]** A second adapter 34 (see Figures 1, 2, 3, and 4), also included in the liquid supply assembly 10, is preferably of metal (e.g., aluminum), has first and second spaced end portions 36 and 38, and has a through opening 40 extending through those end portions 36 and 38. The first end portion 36 of the second adapter 34 has internal threads 41 and six flattened wrench engageable surface portions 42 around its periphery, thereby being adapted to be releasably engaged with external threads on the inlet port of the gravity fed spray gun 11. The first adapter 20 and the second end portion

38 of the second adapter 34 have connector parts that are adapted for releasable liquid tight engagement with their through openings 26 and 40 in communication. Those connector parts include axially spaced radially outwardly projecting sealing rings 43 along the outer surface of the cylindrical portion 24, and a cylindrical inner surface 44 of the second adapter 34 that defines a cylindrical bore opening through the end of the second adapter 34 opposite the threads 41. That bore is adapted to receive the cylindrical portion 24 of the first adapter 20 in an engaged position with the sealing rings 43 in slightly compressed liquid tight engagement with the inner surface 44 defining the bore and with an end surface 46 on a collar 45 around the second end portion 38 of the second adapter 34 abutting a boss 47 in the first adapter 20 around the cylindrical portion 24. The collar 45 has major cylindrically concave recesses 48 along opposite sides of its periphery (see Figure 4) adapted to pass the distal ends of hook members 49 projecting from the transverse portion 28 of the first adapter 20 on opposite sides of the cylindrical portion 24 when the cylindrical portion 24 is pressed axially into the bore with the first and second adapters 20 and 34 in a first relative position at which the hook members 49 are aligned with the major recesses 48 in the collar 45. The first and second adapters 20 and 34 can then be rotated relative to each other to a second relative position to cause the resiliently flexible projecting hook members 49 to be deflected outwardly by, and to move around, cylindrically convex cam lobes 50 projecting radially outwardly on corresponding sides of the major recesses 48 until the projecting hook members 49 are positioned in minor cylindrically concave recesses 51 in the collar 45 at which opposed inwardly projecting lips 52 on the distal ends of the projecting hook members 49 are engaged over a surface 53 of the collar 45 adjacent the first end 36 of the second adapter 34. Lugs 54 projecting axially past the end surface 46 of the collar 45 are adapted to move between positions engaging sides of the boss 47 on the first adapter 20 when the cylindrical portion 24 is in its engaged position in the bore defined by the inner surface 44, thereby limiting relative movement between the adapters 20 and 34 to movement to and between those first and second relative positions.

**[0014]** The liquid supply assembly 10 further includes a tapered, pointed, removable pin 56 (e.g., a pin of the type sometimes called a "push pin") extending through a passageway 58 in the side wall 13 of the cup 12 adjacent its bottom wall 16 (see Figures 1 and 5). On the end of the pin 56 opposite its point is a molded head 60 by which the pin 56 can be manually pressed through the side wall 13 to form the passageway 58. When the cup 12 is inverted to supply liquid to the spray gun 11 as is illustrated in Figure 6, the pin 56 can be removed so that the passageway 58 will provide vacuum relief for the cup 12 by then allowing air to enter the cup 12 through the passageway 58 above the liquid (e.g., paint) being supplied to the spray gun 11. Before and after any

such spraying operations that pin 56 may be positioned in the passageway 58 as is illustrated in Figure 5 to preclude liquid within the cup 12 from leaking through the passageway 58 when the cup is supported on its bottom wall 16.

**[0015]** The combination 10 can also include a removable filter assembly 62 (see Figures 2 and 3) of a known commercially available type (e.g., the filter commercially designated "paint filter kit" that is commercially available from Standard Color, St. Paul, MN). The filter assembly 62 includes a stiff polymeric frame comprising a cylindrical outlet portion 64 having a cylindrical outer surface frictionally engaged within the inner surface defining the through opening 26 in the central portion 24, which outlet portion 64 has a through opening. The frame of the filter assembly 62 further includes an inlet portion 66 projecting from the inner surface 21 of the transverse portion 28 of the first adapter 20. The inlet portion 66 has four axially extending rectangular inlet passageways 67 spaced around its periphery that communicate with the through opening in the outlet portion 64, and includes a filter screen 68 extending across the inner ends of those inlet passageways 67.

**[0016]** A method according to the present invention for providing a supply of mixed liquids for the gravity fed liquid spraying device 11 includes mixing the liquids in the mixing cup 12 using the indicia 19 to indicate the levels to which the liquids should be sequentially poured into the cup 12 to achieve the desired ratio between the liquids; engaging the peripheral part 30 of the first adapter 20 with the top end 14 of the mixing cup 12 containing the mixed liquids; engaging the first end 36 of the second adapter 34 with the inlet port of the liquid spraying device 11 (if this has not already been done); engaging the connector parts as described above (this being done with the mixing cup supported on its bottom wall and the spraying device inverted as illustrated in Figure 3); and positioning the spraying device 11 as illustrated in Figure 4 so that the bottom wall 16 of the mixing cup 12 is uppermost to feed the liquid in the mixing cup 12 to the spraying device 11 through the filter assembly 62 and the openings 26 and 40 in the adapters 20 and 34. That method can further include inserting the tapered pin 56 through the side wall 13 of the mixing cup 12 adjacent its bottom wall 16, and removing the tapered pin 56 from the side wall 13 after the spraying device 11 is positioned with the bottom wall 16 of the mixing cup 12 uppermost as illustrated in Figure 4 to feed the liquid in the mixing cup 12 to the spraying device. Such insertion of the tapered pin 56 provides the passageway 58 through the side wall 13 of the mixing cup 12 adjacent its bottom wall 16 so that air can flow into the cup 12 through the passageway 58 as the liquid is sprayed to restrict causing a vacuum in the mixing cup 12. If liquid remains in the mixing cup 12 after use of the liquid spraying device 11, the pin 56 can be inserted through the passageway 58 to restrict leakage of liquid through the passageway 58; the spraying device 11 can again be inverted to the po-

sition illustrated in Figure 3, the connector parts can be disconnected, the first adapter 20 can be removed from the top end 14 of the mixing cup 12 containing the remaining liquid; a conventional cover 70 (see Figure 7) can be applied to the top end 14 of the mixing cup 12, and the remaining liquid can be stored for future use in the covered mixing cup 12. The inexpensive first adapter 20 and the filter assembly 52 can then be disposed of so that cleanup of the liquid supply assembly 10 only requires cleaning the second adapter 34, which is cleaned with the spray gun 11.

**[0017]** The present invention has now been described with reference to one embodiment thereof. It will be apparent to those skilled in the art that many changes can be made in the embodiment described without departing from the scope of the present invention. For example, any of a number of different types of connectors can be used between the adapters 20 and 34. Thus, the scope of the present invention should not be limited to the structures and methods described in this application, but only by the structures and methods described by the language of the claims.

## Claims

1. A liquid supply assembly (10) for use on a gravity fed liquid spraying device (11), said supply assembly (10) comprising:

a mixing cup (12) of stiff polymeric material comprising a side wall (13) having top and bottom ends (14, 15), and a bottom wall (16) extending across and closing the bottom end (15) of said side wall (13), said top end (14) of said side wall (13) defining an opening into said cup (12), and said side wall (13) bearing indicia (19) indicating the levels to which a plurality of different liquids can be sequentially poured into the cup (12) to achieve a predetermined ratio between the liquids;

an adapter assembly (20, 34) having an inner major surface and an opposite outer major surface, said adapter assembly (20, 34) comprising a transverse portion (28) including a peripheral part (30) defining a groove (32) along said inner surface receiving said top end (14) of said mixing cup (12) in sealing engagement with said peripheral part (30), and a first end portion (36) opposite said transverse portion (28) adapted to releasably engage an inlet port of the gravity fed liquid spraying device (11), said inner surface defining a through opening (26, 40) extending through said transverse portion (28) and said first end portion (36);

characterized by said assembly further including a tapered removable pin (56) extending

through said side wall (13) of said mixing cup (12) adjacent said bottom wall (16), said pin (56) having been pressed through the side wall (13) to form a passageway (58) through the side wall (13), being positioned in the passageway (58) to restrict any liquid in the mixing cup (12) from moving through the passageway (58), being removable from the passageway (58) to allow air to move through the passageway (58) into the mixing cup (12) adjacent said bottom wall (16), and after such removal being again positionable in the passageway (58) to again restrict any liquid in the mixing cup (12) from moving through the passageway (58).

2. A liquid supply assembly (10) according to claim 1, said adapter assembly comprising:

a first adapter (20) of polymeric material having said inner major surface (21) and said opposite outer major surface (22), said first adapter (20) comprising a central portion (24) having a through opening (26) and said transverse portion (28); and  
a second adapter (34) having said first end portion (36) and a second end portion (38) spaced from said first end portion (36), said second adapter (34) having a through opening (40) extending through said first and second end portions (36, 38), said first end portion (36) being adapted to releasably engage an inlet port of the gravity fed liquid spraying device (11);

said second end portion (38) of said second adapter (34) and said central portion (24) of said first adapter (20) having connector parts in manually releasable liquid tight engagement between said adapters (20, 34) with said through openings (26, 40) in communication.

3. A liquid supply assembly (10) according to claim 2 further including a removable filter assembly (62) including a frame comprising an outlet portion (64) engaged across said through opening (26) in said central portion (24) and having a through opening, said frame further including an inlet portion (66) projecting from the inner surface (21) of said first adapter (20) and having inlet passageways (67) communicating with said through opening in said outlet portion (64), and a filter screen (68) extending across said inlet passageways (67).

4. A method for providing a supply of mixed liquids for a gravity fed liquid spraying device (11), said method comprising the steps of:

providing a mixing cup (12) of stiff polymeric material comprising a side wall (13) having top and bottom ends (14, 15), and a bottom wall

(16) extending across and closing the bottom end (15) of said side wall (13), said top end (14) of said side wall (13) defining an opening into said cup (12), and said side wall (13) bearing indicia (19) indicating the levels to which the liquids can be sequentially poured into the cup (12) to achieve a predetermined ratio between the liquids;

providing adapters including a first adapter (20) having an inner major surface (21) and an opposite outer major surface (22), said first adapter (20) comprising a central portion (24) having a through opening (26) and a transverse portion (28) including a peripheral part (30) defining a groove (32) along said inner major surface (21) adapted to receive the top end (14) of said mixing cup (12) in sealing engagement with said peripheral part (30), and a second adapter (34) having a first end portion (36) and a second end portion (38) spaced from said first end portion (36), said second adapter (34) having a through opening (40) extending through said first and second end portions (36, 38), said first end portion (36) being adapted to engage an inlet port of the gravity fed liquid spraying device (11); said second end portion (38) of said second adapter (34) and said central portion (24) of said first adapter (20) having connector parts adapted for manually releasable liquid tight engagement between said adapters (20, 34) with said through openings (26, 40) in communication;

mixing the liquids in the mixing cup (12) using the indicia (19) to indicate the levels to which the liquids are poured into the cup (12) to achieve a predetermined ratio between the liquids;  
engaging the first adapter (20) with the top end (14) of the side wall (13) of the mixing cup (12) containing the mixed liquids;

**characterised by** inserting a tapered pin (56) through the side wall (13) of the mixing cup (12) adjacent said bottom wall (16) to form a passageway (58) through the sidewall, said pin (56) being positioned in the passageway (58) to restrict any liquid in the mixing cup (12) from moving through the passageway (58);

engaging the first end portion (36) of the second adapter (34) with an inlet port of the gravity fed liquid spraying device (11);

manually engaging the connector parts;

positioning the spraying device (11) so that the bottom wall (16) of the mixing cup (12) is uppermost to feed the liquid in the mixing cup (12) to the spraying device (11) through the openings in the adapters (20, 34); and

removing the tapered pin (56) from the side

wall (13) during the positioning step to allow air to move through the passageway (58) into the mixing cup (12) adjacent said bottom wall (16).

5. A method according to claim 4 further including the steps, used when liquid remains in the mixing cup (12) after use of the liquid spraying device, of reinserting the pin (56) through the passageway (58) to restrict leakage of liquid through the passageway (58), manually separating the connector parts to separate the adapters (20, 34), removing the first adapter (20) from the top end of the mixing cup (12) containing the remaining liquid, applying a cover to the top end of the mixing cup (12), and storing the remaining liquid in the covered mixing cup (12).
6. A method according to claim 4 wherein said first adapter (20) is of polymeric material and said method further includes the step of manually separating the connector parts to separate the adapters (20, 34), removing the first adapter (20) from the top end of the mixing cup (12), and disposing of the first adapter (20).

#### Patentansprüche

1. Flüssigkeitszufuhr Aufbau (10) zur Verwendung auf einer schwerkraftgespeisten Flüssigkeitsspritzvorrichtung (11), wobei der Zufuhr Aufbau (10) aufweist:
  - einen Mischbecher (12) aus steifem Polymermaterial, der eine Seitenwand (13) mit oberen und unteren Enden (14, 15) und eine Bodenwand (16) aufweist, die sich über das untere Ende (15) der Seitenwand (13) erstreckt und es verschließt, wobei das obere Ende (14) der Seitenwand (13) eine Öffnung in dem Becher (12) definiert, und die Seitenwand (13) eine Anzeige (19) trägt, die die Pegel anzeigt, bis zu denen mehrere unterschiedliche Flüssigkeiten aufeinanderfolgend in den Becher (12) gegossen werden können, um ein vorbestimmtes Verhältnis zwischen den Flüssigkeiten zu erzielen,
  - einen Adapter Aufbau (20, 34), der eine Hauptinnenfläche und eine gegenüberliegende Hauptaußenfläche aufweist, wobei der Adapter Aufbau (20, 34) einen schräg verlaufenden Abschnitt (28), der ein Umfangsteil (30) aufweist, das eine Rille (32) längs der Innenfläche definiert, der das obere Ende (14) des Mischbechers (12) in abdichtendem Eingriff mit dem Umfangsteil (30) aufnimmt, und einen ersten Endabschnitt (36) aufweist, der dem schräg verlaufenden Abschnitt (28) gegenüberliegt und angepaßt ist, lösbar in einen Einlaßanschluß der schwerkraftgespeisten Flüssigkeitsspritzvorrichtung (11) in Eingriff zu nehmen, wobei

die Innenfläche in eine Durchgangsöffnung (26, 40) definiert, die sich durch den schräg verlaufenden Abschnitt (28) und den ersten Endabschnitt (36) erstreckt;

dadurch gekennzeichnet, daß der Aufbau ferner einen kegelförmigen entfernbaren Stift (56) aufweist, der sich durch die Seitenwand (13) des Mischbechers (12) angrenzend zur Bodenwand (16) erstreckt, wobei der Stift (56) durch die Seitenwand (13) gedrückt worden ist, um einen Durchgang (58) durch die Seitenwand (13) zu bilden, im Durchgang (58) angeordnet ist, um jede Flüssigkeit im Mischbecher (12) daran zu hindern, sich durch den Durchgang (58) zu bewegen, aus dem Durchgang (58) entferntbar ist, um es zuzulassen, daß Luft sich durch den Durchgang (58) in den Mischbecher (12) angrenzend zur Bodenwand (16) bewegt, und nach einer solchen Entfernung erneut im Durchgang (58) angeordnet werden kann, um erneut jede Flüssigkeit im Mischbecher (12) daran zu hindern, sich durch den Durchgang (58) zu bewegen.

2. Flüssigkeitszufuhr Aufbau (10) nach Anspruch 1, wobei der Adapter Aufbau aufweist:

einen ersten Adapter (20) aus Polymermaterial, der die Hauptinnenfläche (21) und eine gegenüberliegende Hauptaußenfläche (22) aufweist, wobei der erste Adapter (20) einen zentralen Abschnitt (24) mit einer Durchgangsöffnung (26) und den schräg verlaufenden Abschnitt (28) aufweist; und

einen zweiten Adapter (34) mit dem ersten Endabschnitt (36) und einem zweiten Endabschnitt (38), der vom ersten Endabschnitt (36) beabstandet ist, wobei der zweite Adapter (34) eine Durchgangsöffnung (40) aufweist, die sich durch die ersten und zweiten Endabschnitte (36, 38) erstreckt, wobei der erste Endabschnitt (36) angepaßt ist,

einen Einlaßanschluß der schwerkraftgespeisten Flüssigkeitsspritzvorrichtung (11) lösbar in Eingriff zu nehmen; wobei der zweite Endabschnitt (38) des zweiten Adapters (34) und der zentrale Abschnitt (24) des ersten Adapters (20) Verbinderteile in einem manuell lösbaren flüssigkeitsdichten Eingriff zwischen den Adaptern (20, 34) aufweist, wobei die Durchgangsöffnungen (26, 40) in Verbindung stehen.

3. Flüssigkeitszufuhr Aufbau (10) nach Anspruch 2, der ferner einen entfernbaren Filter Aufbau (62) aufweist, der einen Rahmen, der einen Auslaßabschnitt (64) aufweist, der über der Durchgangsöffnung (26) in dem zentralen Abschnitt (24) in Eingriff steht und eine Durchgangsöffnung aufweist, wobei

der Rahmen ferner einen Einlaßabschnitt (66) aufweist, der aus der Innenfläche (21) des ersten Adapters (20) vorsteht und Einlaßdurchgänge (67) aufweist, die mit der Durchgangsöffnung in dem Auslaßabschnitt (64) in Verbindung stehen, und ein Filtersieb (68) aufweist, das sich über die Einlaßdurchgänge (67) erstreckt.

4. Verfahren zum Bereitstellen einer Zufuhr gemischter Flüssigkeiten für eine schwerkraftgespeiste Flüssigkeitsspritzvorrichtung (11), wobei das Verfahren die Schritte aufweist:

Bereitstellen eines Mischbechers (12) aus steifem Polymermaterial, der eine Seitenwand (13) mit oberen und unteren Enden (14, 15) und eine Bodenwand (16) aufweist, die sich über das untere Ende (15) der Seitenwand (13) erstreckt und es verschließt, wobei das obere Ende (14) der Seitenwand (13) eine Öffnung in dem Becher (12) definiert und die Seitenwand (13) eine Anzeige (19) trägt, die die Pegel anzeigt, bis zu denen die Flüssigkeiten aufeinanderfolgend in den Becher (12) gegossen werden können, um ein vorbestimmtes Verhältnis zwischen den Flüssigkeiten zu erzielen;

Bereitstellen von Adaptern, die einen ersten Adapter (20) mit einer Hauptinnenfläche (21) und einer gegenüberliegenden Hauptaußenfläche (22), wobei der erste Adapter (20) einen zentralen Abschnitt (24) mit einer Durchgangsöffnung (26) und einen schräg verlaufenden Abschnitt (28) aufweist, der ein Umfangsteil (30) aufweist, das eine Rille (32) längs der Hauptinnenfläche (21) aufweist, das angepaßt ist, das obere Ende (14) des Mischbechers (12) in abdichtendem Eingriff mit dem Umfangsteil (30) aufzunehmen, und einen zweiten Adapter (34) mit einem ersten Endabschnitt (36) und einem zweiten Endabschnitt (38), der von dem ersten Endabschnitt (36) beabstandet ist, aufweisen, wobei der zweite Adapter (34) eine Durchgangsöffnung (40) aufweist, die sich durch die ersten und zweiten Endabschnitte (36, 38) erstreckt, wobei der erste Endabschnitt (36) angepaßt ist, einen Einlaßanschluß der schwerkraftgespeisten Flüssigkeitsspritzvorrichtung (11) in Eingriff zu nehmen; wobei der zweite Endabschnitt (38) des zweiten Adapters (34) und der zentrale Abschnitt (24) des ersten Adapters (20) Verbinderteile aufweisen, die für einen manuell lösbaren flüssigkeitsdichten Eingriff zwischen den Adaptern (20, 34) angepaßt sind, wobei die Durchgangsöffnungen (26, 40) in Verbindung stehen;

Mischen der Flüssigkeiten im Mischbecher (12) unter Verwendung der Anzeige (19), um die Pegel anzuzeigen, bis zu denen die Flüssigkeiten

in den Becher (12) gegossen werden, um ein vorbestimmtes Verhältnis zwischen den Flüssigkeiten zu erreichen;

in Eingriff bringen des ersten Adapters (20) mit dem oberen Ende (14) der Seitenwand (13) des Mischbechers (12), der die gemischten Flüssigkeiten enthält;

**gekennzeichnet durch** Einfügen eines kegelförmigen Stifts (56) **durch** die Seitenwand (13) des Mischbechers (12) angrenzend an die Bodenwand (16) um einen Durchgang (58) **durch** die Seitenwand zu bilden, wobei der Stift (56) in dem Durchgang (58) angeordnet wird, um jede Flüssigkeit im Mischbecher (12) daran zu hindern, sich **durch** den Durchgang (58) zu bewegen;

in Eingriff bringen des ersten Endabschnitts (36) des zweiten Adapters (34) mit einem Einlaßanschluß der schwerkraftgespeisten Flüssigkeitsspritzvorrichtung (11); manuelles in Eingriff bringen der Verbinderteile;

Anordnen der Spritzvorrichtung (11), so daß die Bodenwand (16) des Mischbechers (12) zuoberst ist, um die Flüssigkeit im Mischbecher (12) der Spritzvorrichtung (11) **durch** die Öffnungen in den Adaptern (20, 34) zuzuführen; und

Entfernen des kegelförmigen Stifts (56) aus der Seitenwand (13) während des Anordnungsschritts, um es zuzulassen, daß sich Luft **durch** den Durchgang (58) angrenzend an die Bodenwand (16) in den Mischbecher (12) bewegt.

5. Verfahren nach Anspruch 4, das ferner die Schritte aufweist, die verwendet werden, wenn Flüssigkeit im Mischbecher (12) nach dem Gebrauch der Flüssigkeitsspritzvorrichtung zurückbleibt: Wiedereinfügen des Stifts (56) durch den Durchgang (58), um ein Auslaufen der Flüssigkeit durch den Durchgang (58) zu verhindern, manuelles Trennen der Verbinderteile, um die Adapter (20, 34) zu trennen, Entfernen des ersten Adapters (20) vom oberen Ende des Mischbechers (12), der die restliche Flüssigkeit enthält, Aufbringen eines Deckels auf das obere Ende des Mischbechers (12) und Aufbewahren der restlichen Flüssigkeit in dem abgedeckten Mischbecher (12).

6. Verfahren nach Anspruch 4, wobei der erste Adapter (20) aus einem Polymermaterial besteht und das Verfahren ferner den Schritt aufweist: manuelles Trennen der Verbinderteile, um die Adapter (20, 34) zu trennen, Entfernen des ersten Adapters (20) vom oberen Ende des Mischbechers (12) und Entsorgen des ersten Adapters (20).



## R revendication

1. Assemblage de fourniture de liquide (10) pour une utilisation sur un dispositif de vaporisation de liquide alimenté par gravité (11), ledit assemblage de fourniture (10) comprenant :

un gobelet mélangeur (12) en un matériau polymère rigide comprenant une paroi latérale (13) ayant des extrémités de sommet et de fond (14, 15) et une paroi de fond (16) s'étendant d'un côté à l'autre et fermant l'extrémité de fond (15) de ladite paroi latérale (13), ladite extrémité de sommet (14) de ladite paroi latérale (13) définissant une ouverture dans ledit gobelet (12), et ladite paroi latérale (13) portant des indices (19) indiquant les niveaux auxquels une pluralité de différents liquides peuvent être versés de façon séquentielle dans le gobelet (12) pour atteindre un rapport prédéterminé entre les liquides ;

un assemblage d'adaptateur (20, 34) ayant une surface principale interne et une surface principale externe opposée, ledit assemblage d'adaptateur (20, 34) comprenant une partie transversale (28) comportant une partie périphérique (30) définissant une rainure (32) le long de ladite surface interne recevant ladite extrémité de sommet (14) dudit gobelet mélangeur (12) en prise étanche avec ladite partie périphérique (30), et une première partie d'extrémité (36) opposée à ladite partie transversale (28) adaptée pour se mettre en prise de façon libérable avec une ouverture d'entrée du dispositif de vaporisation de liquide alimenté par gravité (11), ladite surface interne définissant une ouverture traversante (26, 40) s'étendant à travers ladite partie transversale (28) et ladite première partie d'extrémité (36) ;

caractérisé ce que ledit assemblage comprend en outre une broche amovible effilée (56) s'étendant à travers ladite paroi latérale (13) dudit gobelet mélangeur (12) de façon adjacente à ladite paroi de fond (16), ladite broche (56) ayant été pressée à travers la paroi latérale (13) pour former un passage (58) à travers la paroi latérale (13), étant positionnée dans le passage (58) pour empêcher tout liquide dans le gobelet mélangeur (12) de se déplacer à travers le passage (58), pouvant être enlevée du passage (58) pour permettre à l'air de passer à travers le passage (58) dans le gobelet mélangeur (12) adjacent à ladite paroi de fond (16), et après cet enlèvement, pouvant être positionnée à nouveau dans le passage (58) pour empêcher à nouveau tout liquide dans le gobelet mélangeur (12) de passer à travers le passage (58).

2. Assemblage de fourniture de liquide (10) selon la revendication 1, ledit assemblage d'adaptateur comprenant :

un premier adaptateur (20) en un matériau polymère ayant ladite surface principale interne (21) et ladite surface principale externe opposée (22), ledit premier adaptateur (20) comprenant une partie centrale (24) ayant une ouverture (26) et ladite partie transversale (28) ; et un second adaptateur (34) ayant ladite première partie d'extrémité (36) et une seconde partie d'extrémité (38) espacée de ladite première partie d'extrémité (36), ledit second adaptateur (34) ayant une ouverture traversante (40) s'étendant à travers lesdites première et seconde parties d'extrémité (36, 38), ladite première partie d'extrémité (36) étant adaptée pour se mettre en prise de façon libérable avec une ouverture d'entrée du dispositif de vaporisation de liquide alimenté par gravité (11) ; ladite seconde partie d'extrémité (38) dudit second adaptateur (34) et ladite partie centrale (24) dudit premier adaptateur (20) ayant des parties de connecteur en prise, étanche au liquide et libérable manuellement, entre lesdits adaptateurs (20, 34) avec lesdites ouvertures (26, 40) en communication.

3. Assemblage de fourniture de liquide (10) selon la revendication 2, comprenant en outre un assemblage de filtre amovible (62) comportant un cadre comprenant une partie de sortie (64) en prise à travers ladite ouverture traversante (26) dans ladite partie centrale (24) et ayant une ouverture traversante, ledit cadre comprenant en outre une partie d'entrée (66) se projetant depuis la surface interne (21) dudit premier adaptateur (20) et ayant des passages d'entrée (67) communiquant avec ladite ouverture traversante dans ladite partie de sortie (64), et une grille de filtre (68) s'étendant à travers lesdits passages d'entrée (67).

4. Procédé pour fournir des liquides mélangés à un dispositif de vaporisation de liquide alimenté par gravité (11), ledit procédé comprenant les étapes consistant à :

prévoir un gobelet mélangeur (12) en un matériau polymère rigide comprenant une paroi latérale (13) ayant des extrémités de sommet et de fond (14, 15) et une paroi de fond (16) s'étendant d'un côté à l'autre et fermant l'extrémité de fond (15) de ladite paroi latérale (13), ladite extrémité de sommet (14) de ladite paroi latérale (13) définissant une ouverture dans ledit gobelet (12), et ladite paroi latérale (13) portant des indices (19) indiquant les niveaux aux-



quels les liquides peuvent être versés de façon séquentielle dans le gobelet (12) pour atteindre un rapport prédéterminé entre les liquides ; prévoir des adaptateurs comprenant un premier adaptateur (20) ayant une surface principale interne (21) et une surface principale externe opposée (22), ledit premier adaptateur (20) comprenant une partie centrale (24) ayant une ouverture traversante (26) et une partie transversale (28) comprenant une partie périphérique (30) définissant une rainure (32) le long de ladite surface principale interne (21) adaptée pour recevoir l'extrémité de sommet (14) dudit gobelet mélangeur (12) en prise étanche avec ladite partie périphérique (30), et un second adaptateur (34) ayant une première partie d'extrémité (36) et une seconde partie d'extrémité (38) espacée de ladite première partie d'extrémité (36), ledit second adaptateur (34) ayant une ouverture traversante (40) s'étendant à travers lesdites première et seconde parties d'extrémité (36, 38), ladite première partie d'extrémité (36) étant adaptée pour se mettre en prise avec une ouverture d'entrée du dispositif de vaporisation de liquide alimenté par gravité (11) ; ladite seconde partie d'extrémité (38) dudit second adaptateur (34) et ladite partie centrale (24) dudit premier adaptateur (20) ayant des parties de connecteur adaptées pour être en prise étanche au liquide, libérable manuellement entre lesdits adaptateurs (20, 34) avec lesdites ouvertures (26, 40) en communication ; mélanger les liquides dans le gobelet mélangeur (12) en utilisant les indices (19) pour indiquer les niveaux auxquels les liquides sont versés dans le gobelet (12) pour atteindre un rapport prédéterminé entre les liquides ; mettre en prise le premier adaptateur (20) avec l'extrémité de sommet (14) de la paroi latérale (13) du gobelet mélangeur (12) contenant les liquides mélangés ;

**caractérisé par l'insertion d'une broche effilée (56) à travers la paroi latérale (13) du gobelet mélangeur (12) de façon adjacente à ladite paroi de fond (16) pour former un passage (58) à travers la paroi latérale, ladite broche (56) étant positionnée dans le passage (58) pour empêcher tout liquide dans le gobelet mélangeur (12) de se déplacer à travers le passage (58) ;**

la mise en prise de la première partie d'extrémité (36) du second adaptateur (34) avec une ouverture d'entrée du dispositif de vaporisation de liquide alimenté par gravité (11) ;

la mise en prise manuelle des parties de connecteur ;

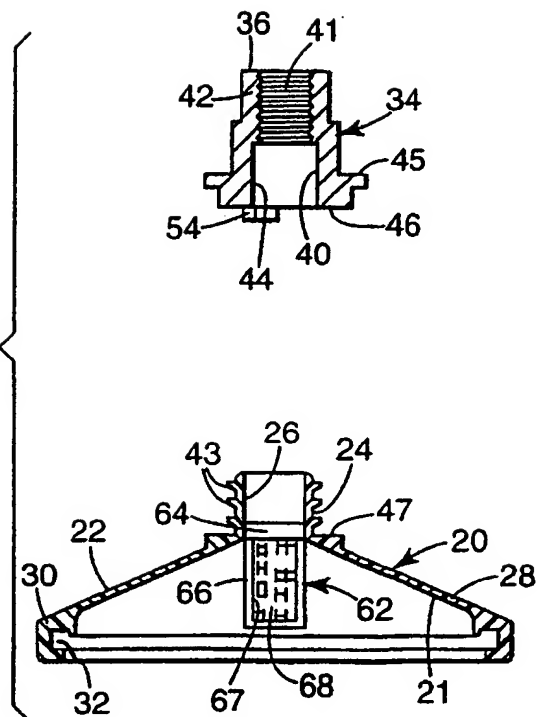
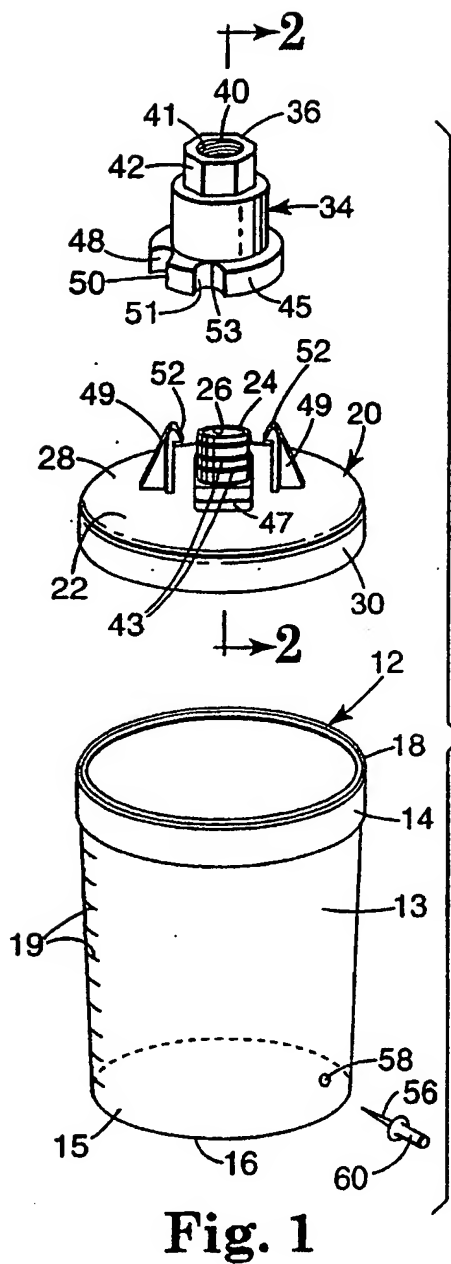
le positionnement du dispositif de vaporisa-

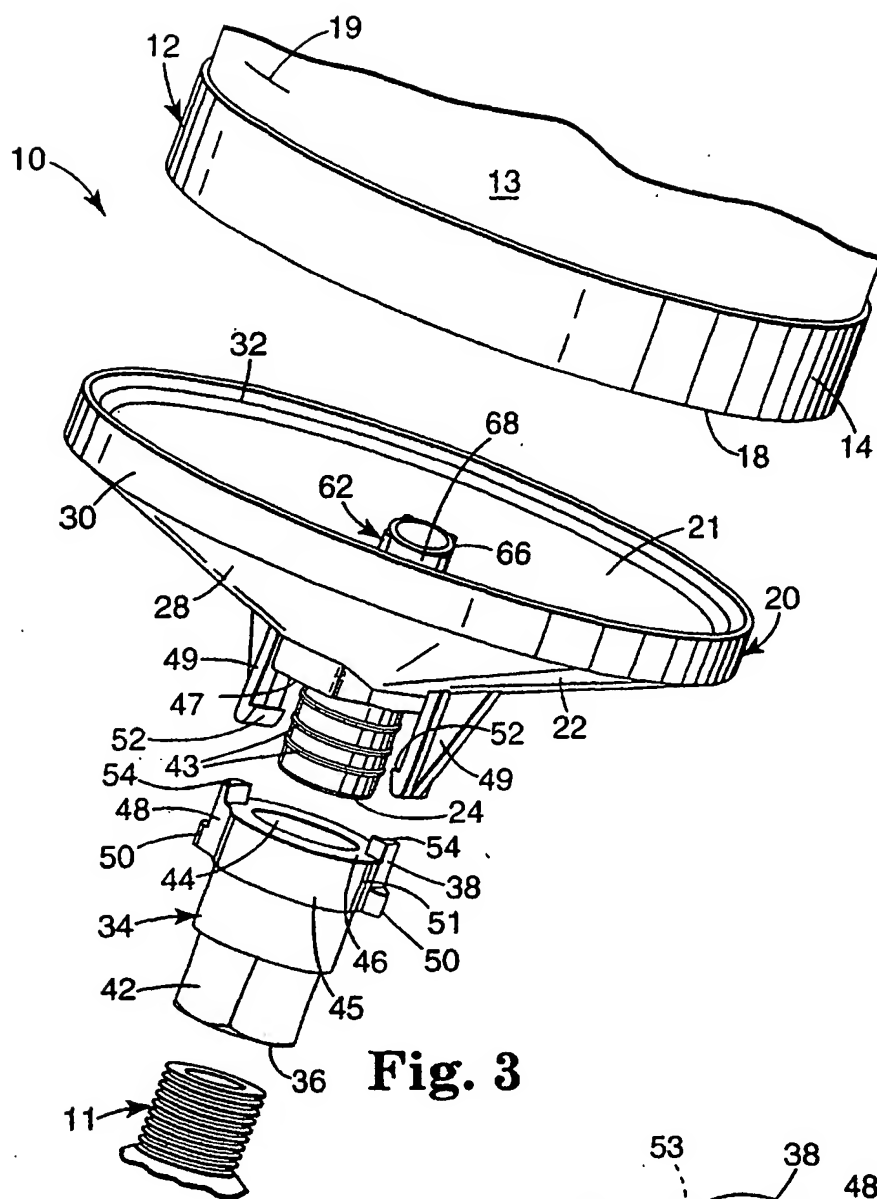
tion (11) de façon à ce que la paroi de fond (16) du gobelet mélangeur (12) soit en haut pour faire passer le liquide qui est dans le gobelet mélangeur (12) dans le dispositif de vaporisation (11) à travers les ouvertures dans les adaptateurs (20, 34) ; t

l'enlèvement de la broche effilée (56) de la paroi latérale (13) pendant l'étape de positionnement pour permettre à l'air de passer à travers le passage (58) vers le gobelet mélangeur (12) de façon adjacente à ladite paroi de fond (16).

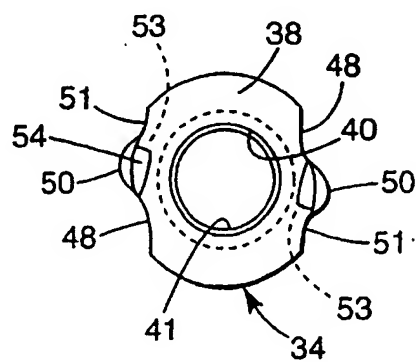
5. Procédé selon la revendication 4, comprenant en outre les étapes, effectuées lorsque le liquide reste dans le gobelet mélangeur (12) après l'utilisation du dispositif de vaporisation de liquide, consistant à réinsérer la broche (56) à travers le passage (58) pour empêcher une fuite du liquide à travers le passage (58), séparer manuellement les parties de connecteur pour séparer les adaptateurs (20, 34), enlever le premier adaptateur (20) de l'extrémité de sommet du gobelet mélangeur (12) contenant le liquide restant, appliquer un couvercle sur l'extrémité de sommet du gobelet mélangeur (12) et stocker le liquide restant dans le gobelet mélangeur recouvert (12).

6. Procédé selon la revendication 4, dans lequel le premier adaptateur (20) est en un matériau polymère et ledit procédé comprend en outre l'étape consistant à séparer manuellement les parties de connecteur pour séparer les adaptateurs (20, 34), enlever le premier adaptateur (20) de l'extrémité de sommet du gobelet mélangeur (12), et jeter le premier adaptateur (20).

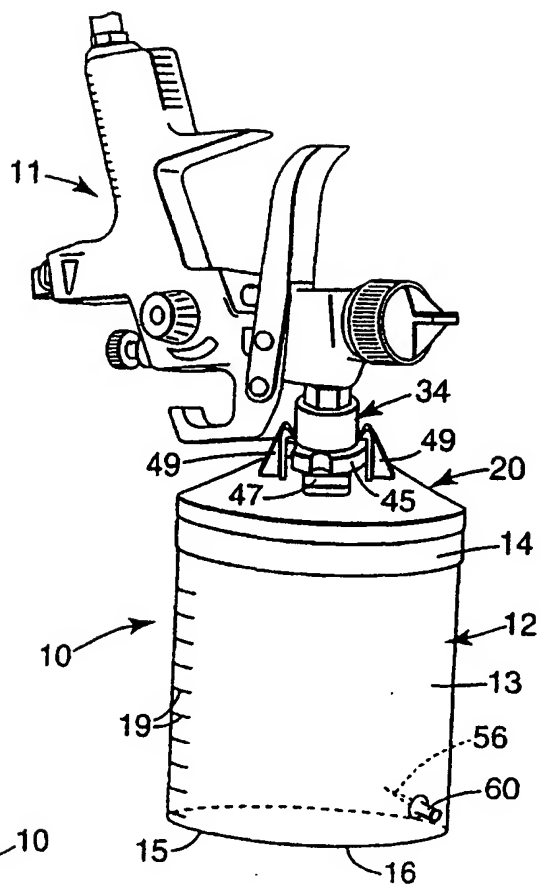




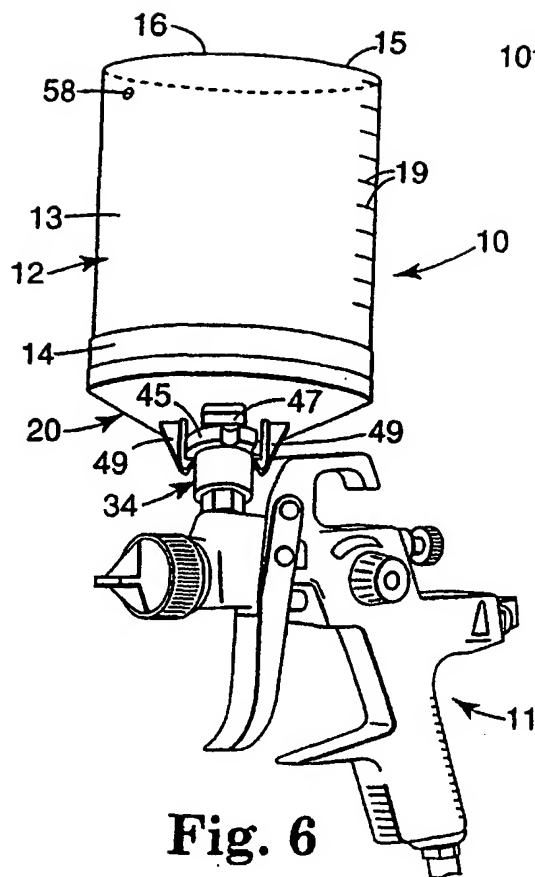
**Fig. 3**



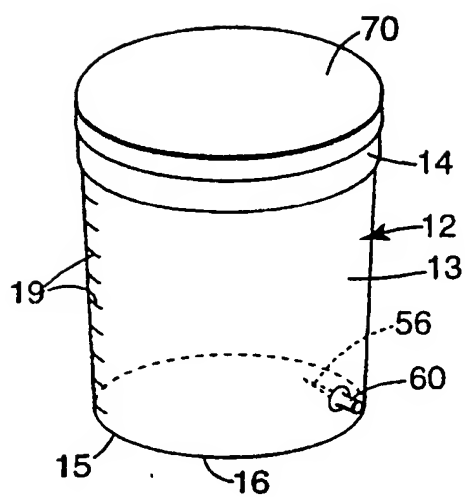
**Fig. 4**



**Fig. 5**



**Fig. 6**



**Fig. 7**

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